

Listing of Claims:

1. (currently amended) A control apparatus, comprising:

a controller;

a detecting device for providing analog signals in response to pressures applied to the controller during normal operation of the controller ~~and an analog calibration signal in response to a predetermined initial calibrating pressure applied to the controller; and~~

a calibration voltage circuit for providing predetermined maximum and minimum calibration voltages; and

an output unit including a level segmenting unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, for segmenting an output level of the analog calibration signals into predetermined discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages initial calibrating pressure and for segmenting an output levels of the analog signals into predetermined the calibration levels during normal operation, and an analog-to-digital (A/D) converting unit for converting the predetermined analog output levels into digital signals each having a plurality of bits.

2. (currently amended) An apparatus according to Claim 1, wherein ~~said the~~ detecting device is a pressure-sensitive device which is arranged at a position relative to ~~said the~~ controller such that a pressure acting on ~~said the~~ controller is transmitted to ~~said the~~ detecting device.

3. (currently amended) An apparatus according to Claim 1, wherein ~~said the~~ detecting device comprises:

a resistor; and

a conductive member which moves together with ~~said~~the controller for contacting ~~said~~the resistor; and

wherein ~~said~~the conductive member has elasticity, and the output level of the analog signal corresponds to a contact area between ~~said~~the resistor and ~~said~~the conductive member.

4. (currently amended) An apparatus according to Claim 1, wherein ~~said~~the detecting device includes:

a conductive member; and

a resistor which moves together with ~~said~~the controller for contacting ~~said~~the conductive member;

wherein ~~said~~the conductive member has elasticity, and the output level of the analog signal corresponds to a contact area between ~~said~~the resistor and ~~said~~the conductive member.

5. (currently amended) An apparatus according to Claim 3 or 4, wherein ~~said~~the conductive member is deformable and a size of the contact area is a function of a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor.

6. (currently amended) An apparatus according to Claim 5, wherein ~~said~~the conductive member is formed with a shape having a peaked longitudinal-section surface.

7. (currently amended) An apparatus according to Claim 5, wherein ~~said~~the conductive member is formed with a shape having a trapezoidal longitudinal-section surface.

8. (currently amended) An apparatus according to Claim 5, wherein ~~said~~the conductive member is formed with a shape having

a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the resistor.

9. (currently amended) An apparatus according to Claim 5, wherein ~~said~~the conductive member is formed with a spherical surface which faces ~~said~~the resistor.

10. (currently amended) An apparatus according to Claim 3 or 4, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases toward a top portion which faces said conductive member.

11. (currently amended) An apparatus according to Claim 10, wherein ~~said~~the resistor is formed with a shape having a peaked longitudinal-section surface.

12. (currently amended) An apparatus according to Claim 10, wherein ~~said~~the resistor is formed with a shape having a trapezoidal longitudinal-section surface.

13. (currently amended) An apparatus according to Claim 10, wherein ~~said~~the resistor is formed with a spherical surface which faces ~~said~~the conductive member.

14. (currently amended) An apparatus according to Claim 3 or 4, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the conductive member.

15. (currently amended) An apparatus according to Claim 3 or 4, wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by

~~said~~the resistor such that a size of the contact area between ~~said~~the conductive member and ~~said~~the resistor changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

16. (cancelled)

17. (currently amended) An apparatus according to Claim 1, wherein ~~said~~the level segmenting unit uniformly segments the output level of the analog signal.

18. (currently amended) A control apparatus, comprising:

a controller;

a detecting device which provides analog signals in response to pressures applied to ~~said~~the controller during normal operation of the controller ~~and an analog calibration signal in response to a predetermined initial calibrating pressure applied to the controller~~, ~~said~~the detecting device including a resistor and a conductive member which move together with ~~said~~the controller for contacting ~~said~~the resistor, where ~~said~~the conductive member has elasticity, and an output level of the analog signal corresponds to a contact area between ~~said~~the resistor and ~~said~~the conductive member;

a calibration voltage circuit for providing predetermined maximum and minimum calibration voltages;

a level segmenting unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting the output level of the analog ~~calibration~~ signals into ~~predetermined~~ discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages ~~initial calibrating~~

~~pressure and for segmenting an output levels of the analog signals into predetermined the calibration levels during normal operation; and~~

an analog-to-digital (A/D) converting unit for converting the ~~predetermined analog output levels~~ into digital signals each having a plurality of bits.

19. (currently amended) A control apparatus, having a controller and a detecting device which provides analog signals in response to pressures applied to ~~said the~~ controller, wherein ~~said the~~ control apparatus further comprises an output unit comprising:

a controller;

a detecting device which provides analogs signal in response to pressures applied to ~~said the~~ controller during normal operation of the controller ~~and an analog calibration signal in response to a predetermined initial calibrating pressure applied to the controller, said the~~ detecting device including a conductive member and a resistor which moves together with ~~said the~~ controller for contacting ~~said the~~ conductive member, where ~~said the~~ conductive member has elasticity, and an output level of the analog signal corresponds to a contact area between ~~said the~~ resistor and ~~said the~~ conductive member;

a calibration voltage circuit for providing predetermined maximum and minimum calibration voltages;

a level segmenting unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting the output level of the analog ~~calibration~~ signals into ~~predetermined discrete~~ calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages ~~initial calibrating~~

~~pressure~~ and ~~for~~ segmenting ~~an~~ output levels of the analog signals into ~~predetermined~~ the calibration levels during normal operation; and

an A/D converting unit for converting the ~~predetermined~~ analog output levels into digital signals each having a plurality of bits.

20. (currently amended) A control apparatus according to Claim 18 or 19, wherein ~~said~~the conductive member is deformable and a size of the contact area is a function of a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor.

21. (currently amended) A device according to Claim 20, wherein ~~said~~the conductive member is formed with a shape having a peaked longitudinal-section surface.

22. (currently amended) A device according to Claim 20, wherein ~~said~~the conductive member is formed with a shape having a trapezoidal longitudinal-section surface.

23. (currently amended) A device according to Claim 20, wherein ~~said~~the conductive member is formed with a shape having a cross-sectional area which decreases in discrete steps towards a portion that faces ~~said~~the resistor.

24. (original) A device according to Claim 20, wherein ~~said~~the conductive member is formed with a shape having a spherical surface which faces ~~said~~the resistor.

25. (currently amended) A device according to Claim 18 or 19, wherein ~~said~~the resistor is formed with a shape having a cross-

sectional area which decreases towards a top portion that faces ~~said~~the conductive member.

26. (currently amended) A device according to Claim 25, wherein ~~said~~the resistor is formed with a shape having a peaked longitudinal-section surface.

27. (currently amended) A device according to Claim 25, wherein ~~said~~the resistor is formed with a shape having a trapezoidal longitudinal-section surface.

28. (currently amended) A device according to Claim 25, wherein ~~said~~the resistor is formed with a shape having a spherical surface which faces ~~said~~the conductive member.

29. (currently amended) A device according to Claim 18 or 19, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps towards a portion that faces ~~said~~the conductive member.

30. (currently amended) A device according to Claim 18 or 19, wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor such that a size of the contact area between ~~said~~the conductive member and ~~said~~the resistor changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

31. (currently amended) A control apparatus, comprising:

a controller;

a detecting device for providing analog signals in response to pressures applied to ~~said~~the controller during normal

operation of the controller ~~and an analog calibration signal in response to a predetermined initial calibrating pressure applied to the controller; and~~

a calibration voltage circuit for providing predetermined maximum and minimum calibration voltages; and

an output unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting an output level of the analog calibration signals into predetermined discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages, initial calibrating pressure and for segmenting an output levels of the analog signals into predetermined the calibration levels during normal operation and for converting the predetermined analog output levels into digital signals each having a plurality of bits;

wherein ~~said the~~ detecting device has a conductive member and a resistor, and a contact area between ~~said the~~ conductive member and ~~said the~~ resistor increases in discrete steps with an increase in ~~said the~~ pressure applied to ~~said the~~ controller, and the output level of the analog signal corresponds to the contact area between ~~said the~~ resistor and ~~said the~~ conductive member.

32. (currently amended) An apparatus according to claim 31, wherein ~~said the~~ conductive member moves together with ~~said the~~ controller for contacting ~~said the~~ resistor such that the output level of the analog signal corresponds to the contact area between ~~said the~~ resistor and ~~said the~~ conductive member, and ~~said the~~ conductive member has elasticity.



33. (currently amended) An apparatus according to claim 31, wherein ~~said~~the resistor moves together with ~~said~~the controller for contacting ~~said~~the conductive member such that the output level of the analog signal corresponds to the contact area between ~~said~~the resistor and ~~said~~the conductive member, and ~~said~~the conductive member has elasticity.

34. (currently amended) An apparatus according to claims 32 or 33, wherein ~~said~~the conductive member is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the resistor.

35. (currently amended) An apparatus according to claims 32 or 33, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the conductive member.

36. (currently amended) An apparatus according to claims 32 or 33, wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor such that a size of the contact area changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

37. (currently amended) A device for use in a control apparatus having a controller which provides analog signals in response to pressures applied to ~~said~~the controller during normal operation of the controller ~~and an analog calibration signal in response to a predetermined initial calibrating pressure applied to the controller,~~ ~~said~~the device comprising:

a calibration voltage circuit for providing predetermined maximum and minimum calibration voltages;

an output unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting an output level of the analog ~~calibrating~~ signals into ~~predetermined~~ discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages, ~~initial calibrating pressure and for segmenting an output levels of the analog signals into ~~predetermined~~ the calibration levels during normal operation and for converting the ~~predetermined~~ analog output levels into digital signals each having a plurality of bits;~~

a conductive member; and

a resistor;

wherein a contact area between ~~said the~~ conductive member and ~~said the~~ resistor increases in discrete steps with an increase in the pressure applied to ~~said the~~ controller, and the output level of the analog signal corresponds to the contact area between ~~said the~~ resistor and ~~said the~~ conductive member.

38. (currently amended) An apparatus according to claim 37, wherein ~~said the~~ conductive member moves together with ~~said the~~ controller for contacting ~~said the~~ resistor such that the output level of the analog signal corresponds to the contact area between ~~said the~~ resistor and ~~said the~~ conductive member, and ~~said the~~ conductive member has elasticity.

39. (currently amended) An apparatus according to claim 37, wherein ~~said the~~ resistor moves together with ~~said the~~ controller for contacting ~~said the~~ conductive member such that the output level of the analog signal corresponds to the contact area between ~~said the~~ resistor and ~~said the~~ conductive member, and ~~said the~~ conductive member has elasticity.

40. (currently amended) An apparatus according to claims 38 or 39, wherein ~~said~~the conductive member is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the resistor.

41. (currently amended) An apparatus according to claims 38 or 39, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the conductive member.

42. (currently amended) An apparatus according to claims 38 or 39, wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor such that a size of the contact area changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

43. (currently amended) A method of generating a signal representative of a pressure applied to a control apparatus, comprising:

(a) generating analog signals representative of pressures applied to the control apparatus during normal operation of the control apparatus;

(b) providing predetermined maximum and minimum calibration voltages ~~generating an analog calibration signal in response to a predetermined initial calibrating pressure applied to the control apparatus;~~

(c) monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages and segmenting an output level of the analog signals into discrete calibration levels based on the predetermined maximum and minimum

calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages ~~segmenting the output level of the analog calibration signal into predetermined calibration levels based on the predetermined initial calibrating pressure;~~

(d) segmenting an output levels of the analog signals into ~~predetermined~~ the calibration levels during normal operation; and

(e) assigning preset digital signals corresponding to each of the analog output levels.

44. (currently amended) A method of generating a signal representative of pressures applied to a control apparatus comprising a controller including a resistor and an elastic conductive member which moves together with the controller for contacting the resistor, comprising:

(a) generating analog signals corresponding to a contact area between the resistor and the conductive member during normal operation of the controller;

(b) providing predetermined maximum and minimum calibration voltages ~~generating an analog calibration signal in response to a predetermined initial calibrating pressure applied to the control apparatus;~~

(c) monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages and segmenting an output level of the analog signals into discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages ~~segmenting the output level of the analog calibration signal into predetermined calibration levels based on the predetermined initial calibrating pressure;~~

(d) segmenting ~~an~~ output levels of the analog signals into ~~predetermined~~ the calibration levels during normal operation; and

(e) assigning preset digital signals corresponding to each of the analog output levels.

45. (currently amended) The method as claimed in claim 44, wherein the resistor increases in discrete steps with an increase in ~~said~~ the pressure applied to ~~said~~ the controller.

46. (currently amended) An apparatus according to Claim 1, wherein the output unit calibrates the control apparatus by ascertaining a maximum output level from the detecting device based on a maximum applied pressure such that the level segmenting unit divides the predetermined levels equally up to the maximum output level.

47. (currently amended) An apparatus according to Claim 18 or 19, wherein the level segmenting unit calibrates the control apparatus by ascertaining a maximum output level from the detecting device based on a maximum applied pressure and dividing the predetermined levels equally up to the maximum output level.

48. (currently amended) An apparatus according to Claim 31 or 37, wherein the output unit calibrates the controller by ascertaining a maximum output level from the detecting device based on a maximum applied pressure such that the output unit divides the predetermined levels equally up to the maximum output level.

49. (currently amended) The method as claimed in claims 43 or 44, further comprising calibrating the control apparatus by ascertaining a maximum output level of the analog calibration signal based on a maximum applied pressure and dividing the predetermined levels equally up to the maximum output level.

50. (currently amended) A control apparatus, comprising:

a controller;

a detecting device for providing an analog signals in response to a predetermined initial calibrating pressures applied to the controller during normal operation of the controller; and

first and second potentiometers for providing predetermined maximum and minimum calibration voltages; and

an output unit including a level segmenting unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting an output level of the analog signals into predetermined discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages—initial calibrating pressure, and an analog-to-digital (A/D) converting unit for converting the predetermined calibration analog output levels into digital signals each having a plurality of bits.

51. (currently amended) An apparatus according to Claim 50, wherein ~~said~~the detecting device is a pressure-sensitive device which is arranged at a position relative to ~~said~~the controller such that a pressure acting on ~~said~~the controller is transmitted to ~~said~~the detecting device.

52. (currently amended) An apparatus according to Claim 50, wherein ~~said~~the detecting device comprises:

a resistor; and

a conductive member which moves together with ~~said~~the controller for contacting ~~said~~the resistor; and

wherein ~~said~~the conductive member has elasticity, and the output level of the analog signal corresponds to a contact area between ~~said~~the resistor and ~~said~~the conductive member.

53. (currently amended) An apparatus according to Claim 50, wherein ~~said~~the detecting device includes:

a conductive member; and

a resistor which moves together with ~~said~~the controller for contacting ~~said~~the conductive member;

wherein ~~said~~the conductive member has elasticity, and the output level of the analog signal corresponds to a contact area between ~~said~~the resistor and ~~said~~the conductive member.

54. (currently amended) An apparatus according to Claim 52 or 53, wherein ~~said~~the conductive member is deformable and a size of the contact area is a function of a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor.

55. (currently amended) An apparatus according to Claim 54, wherein ~~said~~the conductive member is formed with a shape having a peaked longitudinal-section surface.

56. (currently amended) An apparatus according to Claim 54, wherein ~~said~~the conductive member is formed with a shape having a trapezoidal longitudinal-section surface.

57. (currently amended) An apparatus according to Claim 54, wherein ~~said~~the conductive member is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the resistor.

58. (currently amended) An apparatus according to Claim 54, wherein ~~said~~the conductive member is formed with a spherical surface which faces ~~said~~the resistor.

59. (currently amended) An apparatus according to Claim 52 or 53, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases toward a top portion which faces ~~said~~the conductive member.

60. (currently amended) An apparatus according to Claim 59, wherein ~~said~~the resistor is formed with a shape having a peaked longitudinal-section surface.

61. (currently amended) An apparatus according to Claim 59, wherein ~~said~~the resistor is formed with a shape having a trapezoidal longitudinal-section surface.

62. (currently amended) An apparatus according to Claim 59, wherein ~~said~~the resistor is formed with a spherical surface which faces ~~said~~the conductive member.

63. (currently amended) An apparatus according to Claim 52 or 53, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the conductive member.



64. (currently amended) An apparatus according to Claim 52 or 53, wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor such that a size of the contact area between ~~said~~the conductive member and ~~said~~the resistor changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

65. (currently amended) An apparatus according to Claim 50, wherein ~~said~~the level segmenting unit uniformly segments the output level of the analog signal.

66. (currently amended) A control apparatus, comprising:

a controller;

a detecting device which provides ~~an~~analog signals in response to a ~~predetermined initial calibrating pressures~~ applied to ~~said~~the controller during normal operation of the controller, ~~said~~the detecting device including a resistor and a conductive member which moves together with ~~said~~the controller for contacting ~~said~~the resistor, where ~~said~~the conductive member has elasticity, and an output level of the analog signal corresponds to a contact area between ~~said~~the resistor and ~~said~~the conductive member;

first and second potentiometers for providing predetermined maximum and minimum calibration voltages;

a level segmenting unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting the output level of the analog signals into ~~predetermined~~discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages~~initial calibrating~~

pressure and segmenting output levels of the analog signals into the calibration levels during normal operation; and

an analog-to-digital (A/D) converting unit for converting the ~~predetermined calibration analog output levels~~ into digital signals each having a plurality of bits.

67. (currently amended) A control apparatus, having a controller and a detecting device which provides an analog signal in response to a pressure applied to ~~said the~~ controller, wherein ~~said the~~ control apparatus further comprises an output unit comprising:

a controller;

a detecting device which provides ~~an analog signals~~ in response to a ~~predetermined initial calibrating pressures~~ applied to ~~said the~~ controller, ~~said the~~ detecting device including a conductive member and a resistor which moves together with ~~said the~~ controller for contacting ~~said the~~ conductive member, where ~~said the~~ conductive member has elasticity, and an output level of the analog signal corresponds to a contact area between ~~said the~~ resistor and ~~said the~~ conductive member;

first and second potentiometers for providing predetermined maximum and minimum calibration voltages;

a level segmenting unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting the output level of the analog signals into ~~predetermined discrete~~ calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages ~~initial calibrating pressure~~ and segmenting output levels of the analog signals into the calibration levels during normal operation; and

an A/D converting unit for converting the ~~predetermined calibration—~~analog output levels into digital signals each having a plurality of bits.

68. (currently amended) A control apparatus according to Claim 66 or 67, wherein ~~said~~the conductive member is deformable and a size of the contact area is a function of a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor.

69. (currently amended) A device according to Claim 68, wherein ~~said~~the conductive member is formed with a shape having a peaked longitudinal-section surface.

70. (currently amended) A device according to Claim 68, wherein ~~said~~the conductive member is formed with a shape having a trapezoidal longitudinal-section surface.

71. (currently amended) A device according to Claim 68, wherein ~~said~~the conductive member is formed with a shape having a cross-sectional area which decreases in discrete steps towards a portion that faces ~~said~~the resistor.

72. (currently amended) A device according to Claim 68 wherein ~~said~~the conductive member is formed with a shape having a spherical surface which faces ~~said~~the resistor.

73. (currently amended) A device according to Claim 66 or 67, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases towards a top portion that faces ~~said~~the conductive member.

74. (currently amended) A device according to Claim 73, wherein ~~said~~the resistor is formed with a shape having a peaked longitudinal-section surface.

75. (currently amended) A device according to Claim 73, wherein ~~said~~the resistor is formed with a shape having a trapezoidal longitudinal-section surface.

76. (currently amended) A device according to Claim 73, wherein ~~said~~the resistor is formed with a shape having a spherical surface which faces ~~said~~the conductive member.

77. (currently amended) A device according to Claim 66 or 67, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps towards a portion that faces ~~said~~the conductive member.

78. (currently amended) A device according to Claim 66 or 67 wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor such that a size of the contact area between ~~said~~the conductive member and ~~said~~the resistor changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

79. (currently amended) A control apparatus, comprising:

a controller;

a detecting device for providing ~~an~~analog signals in response to ~~a predetermined initial calibrating pressures~~applied to ~~said~~the controller during normal operation of the controller;

first and second potentiometers for providing predetermined maximum and minimum calibration voltages; and

an output unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting an output level of the analog signals and for converting the segmented output level of the analog signal into a predetermined discrete calibration levels based on the predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages, initial calibration pressure segmenting output levels of the analog signals into the calibration levels during normal operation and for converting the predetermined calibration analog output levels into digital signals each having a plurality of bits;

wherein said the detecting device has a conductive member and a resistor, and a contact area between said the conductive member and said the resistor increases in discrete steps with an increase in said the pressure applied to said the controller, and the output level of the analog signal corresponds to the contact area between said the resistor and said the conductive member.

80. (currently amended) An apparatus according to claim 79, wherein said the conductive member moves together with said the controller for contacting said the resistor such that the output level of the analog signal corresponds to the contact area between said the resistor and said the conductive member, and said the conductive member has elasticity.

81. (currently amended) An apparatus according to claim 79, wherein said the resistor moves together with said the controller for contacting said the conductive member such that the output

level of the analog signal corresponds to the contact area between ~~said~~the resistor and ~~said~~the conductive member, and ~~said~~the conductive member has elasticity.

82. (currently amended) An apparatus according to claims 80 or 81, wherein ~~said~~the conductive member is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the resistor.

83. (currently amended) An apparatus according to claims 80 or 81, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the conductive member.

84. (currently amended) An apparatus according to claims 80 or 81, wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor such that a size of the contact area changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

85. (currently amended) A device for use in a control apparatus having a controller which provides an analog signal in response to pressures applied to ~~said~~the controller during normal operation of the controller, ~~said~~the device comprising:

first and second potentiometers for providing predetermined maximum and minimum calibration voltages;

an output unit for monitoring voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting an output level of the analog signals into ~~predetermined~~ discrete calibration levels based on a predetermined maximum and minimum calibration voltages after the occurrence of any voltage fluctuations in the predetermined maximum and minimum calibration voltages, segmenting output levels of the analog signals into the calibration levels during normal operation ~~initial calibration pressure~~ and for converting the ~~predetermined calibration analog output~~ levels into digital signals each having a plurality of bits;

a conductive member; and

a resistor;

wherein a contact area between ~~said~~the conductive member and ~~said~~the resistor increases in discrete steps with an increase in the pressure applied to ~~said~~the controller, and the output level of the analog signal corresponds to the contact area between ~~said~~the resistor and ~~said~~the conductive member.

86. (currently amended) An apparatus according to claim 85, wherein ~~said~~the conductive member moves together with ~~said~~the controller for contacting ~~said~~the resistor such that the output level of the analog signal corresponds to the contact area between ~~said~~the resistor and ~~said~~the conductive member, and ~~said~~the conductive member has elasticity.

87. (currently amended) An apparatus according to claim 85, wherein ~~said~~the resistor moves together with ~~said~~the controller for contacting ~~said~~the conductive member such that the output level of the analog signal corresponds to the contact area between ~~said~~the resistor and ~~said~~the conductive member, and ~~said~~the conductive member has elasticity.

88. (currently amended) An apparatus according to claims 86 or 87, wherein ~~said~~the conductive member is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the resistor.

89. (currently amended) An apparatus according to claims 86 or 87, wherein ~~said~~the resistor is formed with a shape having a cross-sectional area which decreases in discrete steps toward a portion which faces ~~said~~the conductive member.

90. (currently amended) An apparatus according to claims 86 or 87, wherein ~~said~~the conductive member is deformable in accordance with a contact pressure exerted on ~~said~~the conductive member by ~~said~~the resistor such that a size of the contact area changes; and ~~said~~the resistor comprises non-conductive regions such that the contact area increases in discrete steps.

91 - 97. (cancelled)